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# SUB-CLINICAL LEVELS OF AUTISTIC TRAITS IMPAIR MULTISENSORY INTEGRATION OF AUDIOVISUAL SPEECH

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## INTRODUCTION

Autism Spectrum Disorder (ASD) is a pervasive neurodevelopmental disorder characterized by restricted interests, repetitive behavior, deficits in social communication and atypical multisensory perception. ASD symptoms are found to varying degrees in the general population. While impairments in multisensory speech processing are widely reported in clinical ASD populations,<sup>[1-2]</sup> the impact of sub-clinical levels of autistic traits on multisensory speech perception is still unclear. The present study examined audiovisual (AV) speech processing in a large non-clinical adult population in relation to autistic traits measured by the Autism-Spectrum Quotient (AQ).<sup>[3]</sup> AV speech processing was assessed using a McGurk paradigm, a simultaneity judgment task and a speech-in-noise task.

## METHOD

### Participants

N = 104  
88 female  
Mean age = 20.06 (SD = 2.43)

### AQ questionnaire

1. Social skill (10 items)
  2. Attention switching (10 items)
  3. Attention to detail (10 items)
  4. Communication (10 items)
  5. Imagination (10 items)
- AQ score = sum 1-5 (50 items)

### Experiments

McGurk paradigm

- Visual /g/ Auditory /b/
- Susceptibility = prop. /d/ response

Simultaneity judgment task

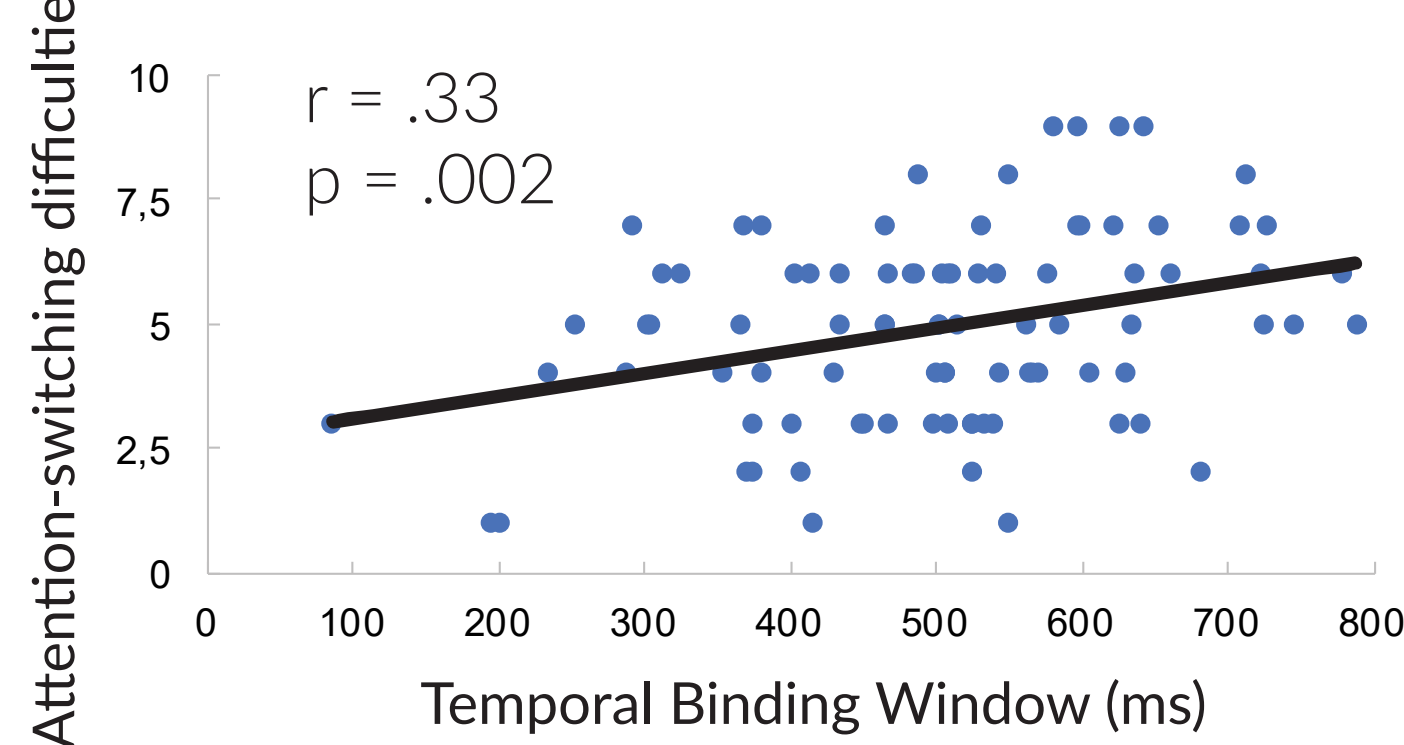
- SOA range = -400 ms to +400 ms
- 40 ms intervals = 21 SOAs
- Temporal binding window width = JND (70% sync response) auditory leading + JND visual leading (ms)

Speech-in-noise task

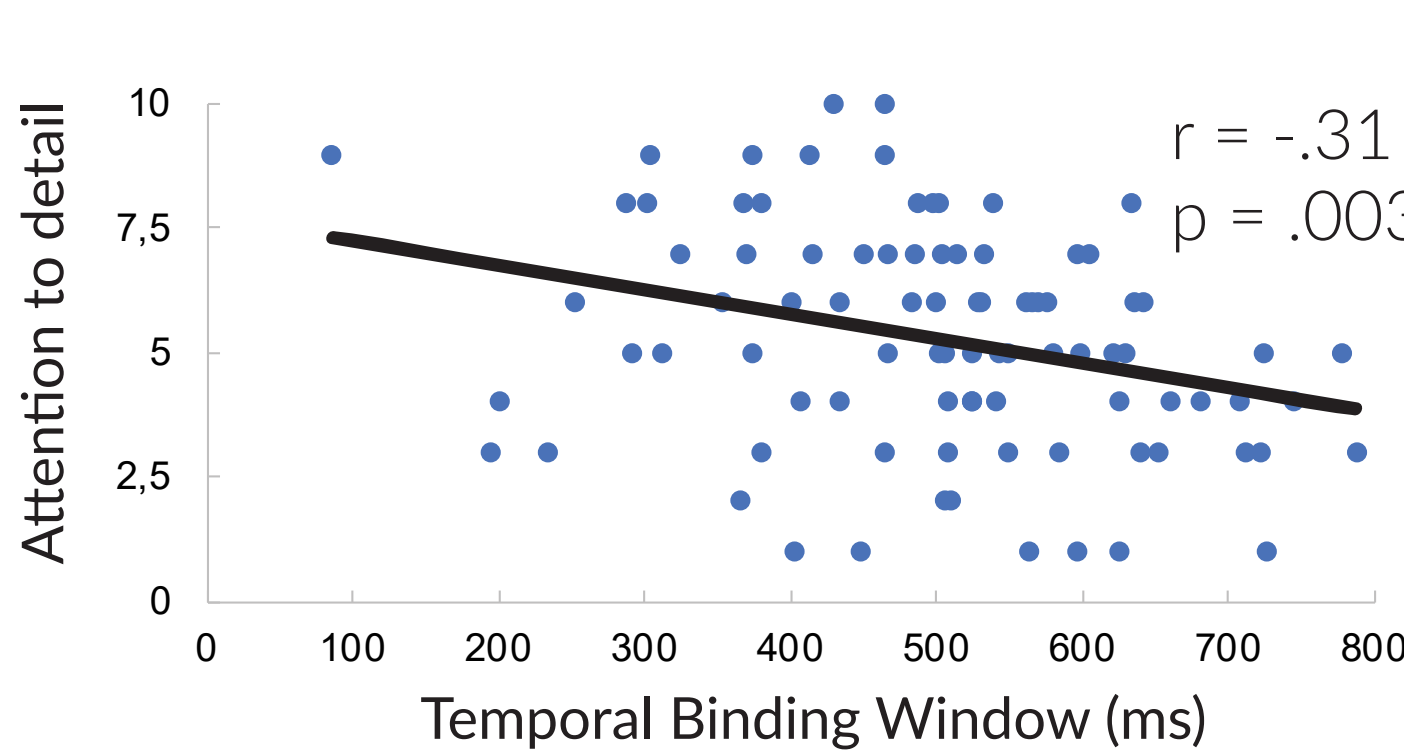
- 112 words, SNRs 0, -4, -8, -12db
- 2 conditions: Auditory-only (A), Audio-visual (AV)
- AV gain = percentage correct AV-A across all SNRs (gain in % correct)

## RESULTS

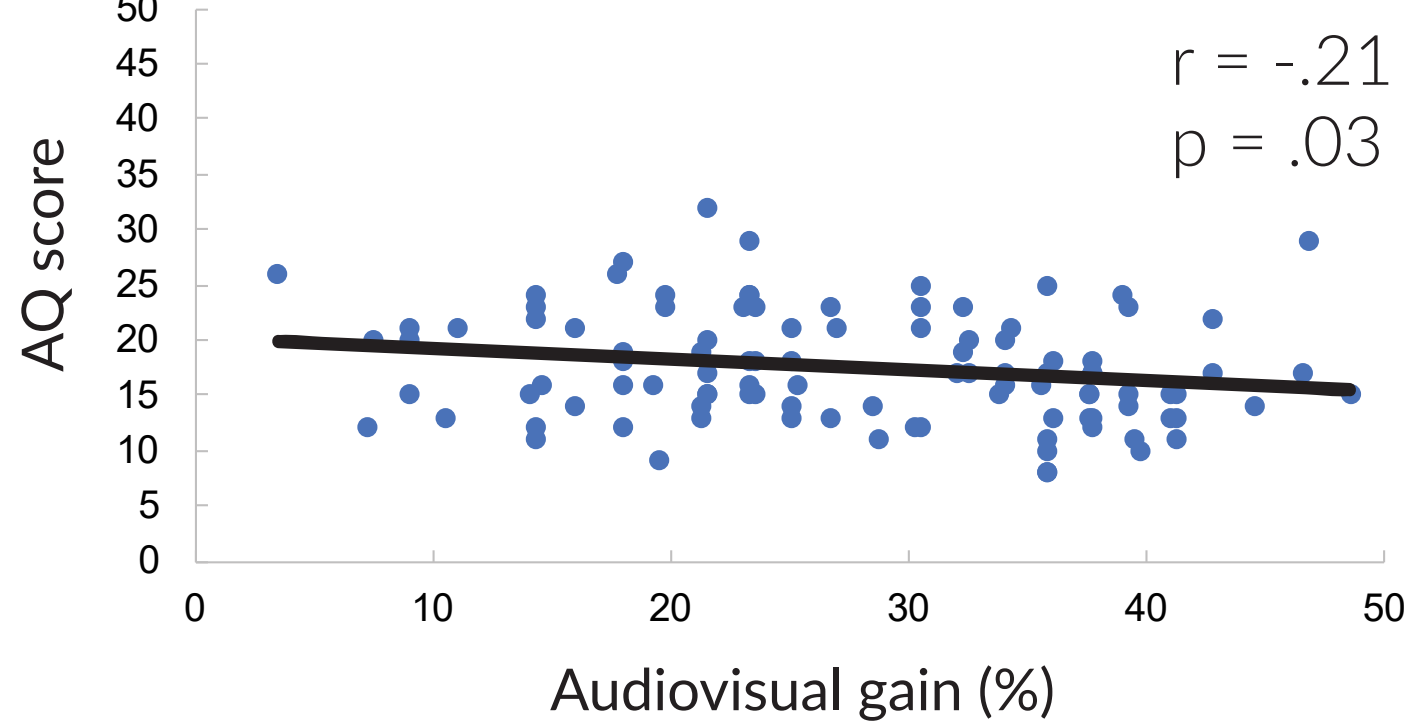
Attention-switching difficulties by TBW



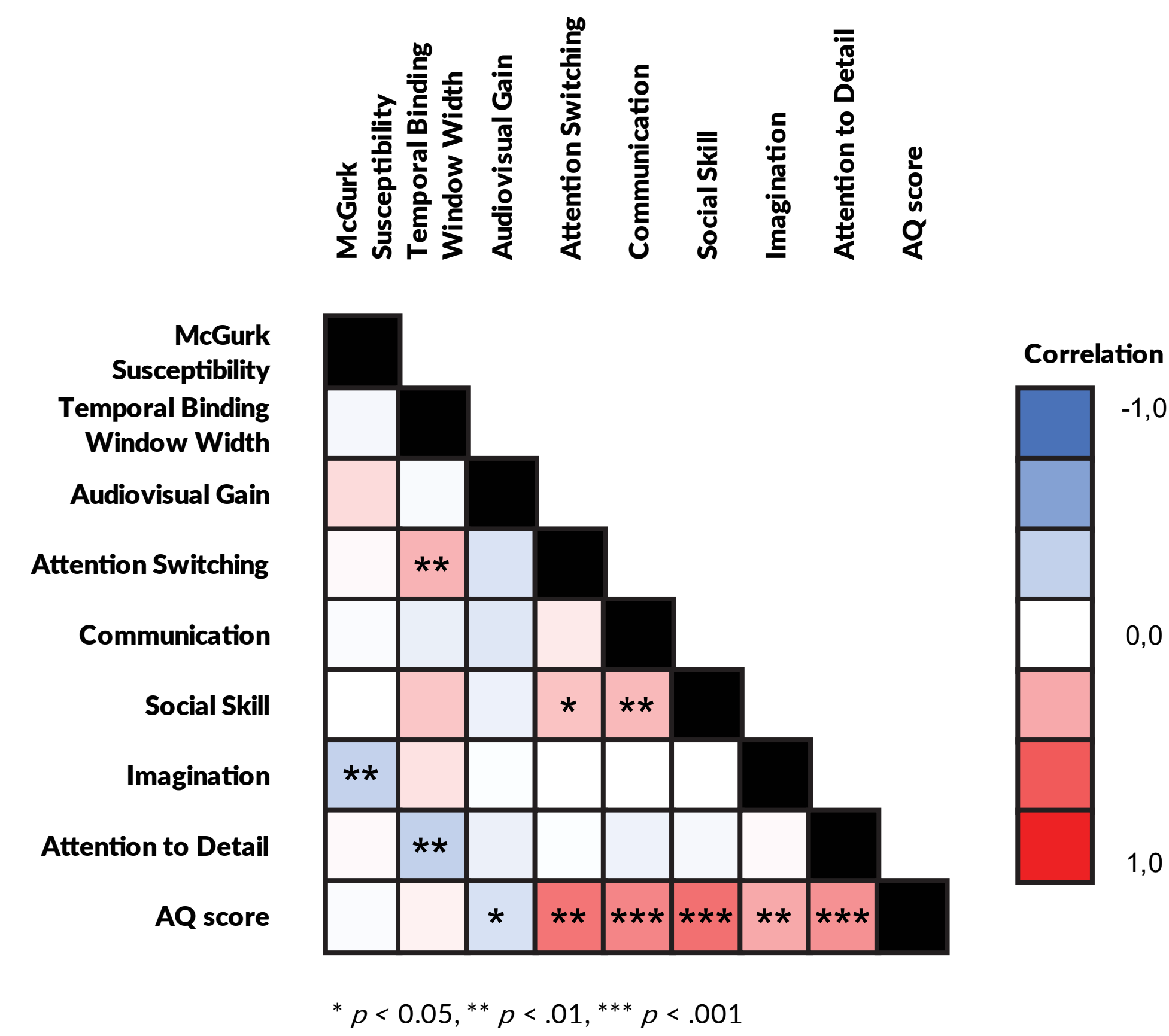
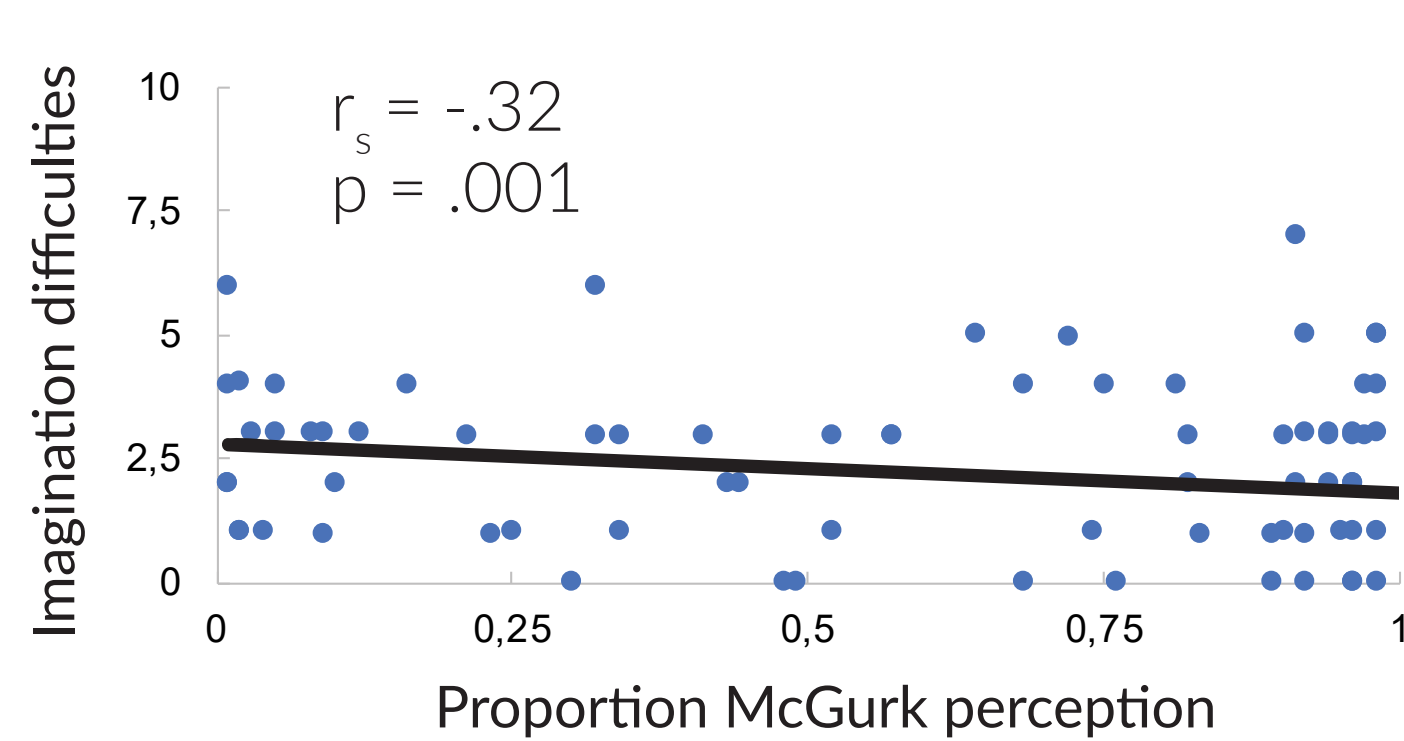
Attention to detail by TBW



AQ score by Audiovisual gain



Imagination difficulties by Proportion McGurk perception



- Difficulty with **Imagination** was associated with lower susceptibility to the **McGurk illusion** ( $r_s = -.32$ ,  $p = .001$ )
- Difficulty with **Attention-switching** was associated with a **wider temporal binding window** ( $r = .33$ ,  $p = .002$ ).
- Increased **Attention to detail** was associated with a **narrower temporal binding window** ( $r = -.31$ ,  $p = .003$ ).
- **AQ score** was associated with **reduced AV gain** from lip-read speech ( $r = -.21$ ,  $p = .03$ ).

## CONCLUSIONS

Our results demonstrate that sub-clinical autistic symptomatology is related to reduced AV speech processing performance, and are consistent with the notion of a spectrum of ASD traits that extends into the general population.

## REFERENCES

1. de Gelder B, Vroomen J, Van der Heide L. Face recognition and lip-reading in autism. *European Journal of Cognitive Psychology* 1991;3(1):69–86.
2. Stevenson RA, Segers M, Ferber S, Barens MD, Camarata S, Wallace MT. Keeping time in the brain: Autism spectrum disorder and audiovisual temporal processing. *Autism Research*.2016;9(7):720–38.
3. Baron-Cohen S, Wheelwright S, Skinner R, Martin J, Clubley E. The Autism-Spectrum Quotient (AQ): Evidence from Asperger Syndrome/High-Functioning Autism, Males and Females, Scientists and Mathematicians. *Journal of Autism and Developmental Disorders* 2001;31(1):5–17.